

# EXHIBIT 76

COLOR



# SPACEX

SPACE EXPLORATION TECHNOLOGIES



## AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

Procedure:	Rev:	Rev. Date:	Release Trac #
<b>AV1200-1A</b>	<b>B</b>	<b>2012-08-17</b>	<b>5401</b>

In Relation To:  
**NASA STD 8739.1A / IPC J-STD-001**

Target Audience:  
**AVIONICS**



Revision	Description	Date
<b>A</b>	<b>AV1200-1A Per Release Trac Ticket #1575</b>	<b>2012/06/08</b>
<b>B</b>	<b>Per Release Trac Ticket #5401</b>	<b>2012/08/17</b>

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## AV1200-1A Rev B



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 5 OF 71

## 4 GENERAL GUIDELINES

### 4.1 Precautions

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use a respirator, safety glasses, gloves, or other Personal Protective Equipment (PPE) as needed for fumes and to protect the boards from contamination by skin contact. The MSDSs for the Conformal Coating products say to use them in a well-ventilated area.



# AV1200-1A Rev B



## AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 32 OF 71

## 6 CONFORMAL COATING

When a conformal coating is specified to be applied to a PCBA follow the steps below.

### 6.1 Precautions

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use gloves, eye protection and facemask, in a well-ventilated areas per the MSDS.

#### 6.1.1 Approved Conformal Coating Products Used by the Avionics Clean Room

Table 6-1 Approved Conformal Coating Products

Approved Component	Part Number	Vendor	Application
Conformal Coating	1A33	HumiSeal	Spray + Brush
Thinner	521	HumiSeal	Spray + Brush
Stripper	1063	HumiSeal	Spray + Brush

#### 6.1.2 Products Being Phased Out

TechSpray Fine-L-Kote Conformal Coating, Type UR, PN 2104-12S, is being phased out and will be used to touch up boards that have already been coated with TechSpray. IPA is used to clean boards coated with TechSpray.



## AV1200-1A Rev B



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 33 OF 71

## 6.2 Preparation

### 6.2.1 Cleaning Coated Boards

- Prior to these Conformal Coating procedures, the boards must have been cleaned per AV2012 Avionics Assembly / Part Cleaning Standard.
- **HumiSeal:** When performing minor cleaning of a board that has been Conformal Coated with HumiSeal Conformal Coating, Type UR, PN 1A33, use HumiSeal Thinner 521. Do NOT use IPA to clean boards coated with HumiSeal PN 1A33. To remove HumiSeal PN1A33 in order to perform rework, use HumiSeal Stripper 1063.
- **TechSpray:** When performing minor cleaning or removal of TechSpray Fine-L-Kote Conformal Coating, Type UR, PN 2104-12S, use IPA.

### 6.2.2 Conformal Coating Mix and Viscosity Check

- In the machine Conformal Coating tank, mix the Conformal Coating, Type UR, with Thinner: 3 parts Conformal Coating to 1 part Thinner.
- After mixing the Conformal Coating, check its viscosity using a Zahn Size 2 Viscosity Cup and a calibrated stopwatch.
- Dip the Viscosity Cup into the Conformal Coating tank and start the stopwatch exactly when you lift it up out of the Conformal Coating. Stop the stopwatch exactly when the Viscosity Cup is empty of Conformal Coating.
- The time it takes for the Conformal Coating to completely drain out of the Viscosity Cup should be between 20 and 21 seconds. If the viscosity is not within this range, mix in some more Thinner, for decreasing viscosity, or some more Conformal Coating, for increasing viscosity, as applicable, and measure the viscosity again until it is within the range.
- Record the viscosity on the Conformal Coating Lot Log Sheet in Appendix A. This includes recording viscosity on the Conformal Coating Lot Log Sheet for manual application and touchup of batches of 5 boards or more

### 6.2.3 Dispensing Conformal Coating for Application and Touch-up

- Dispense the Conformal Coating, Type UR, from the PVA machine by pressing the F4 button, holding a container under the nozzle, and then pressing and holding the Purge button. To stop dispensing, let go of the Purge button.
- After dispensing the Conformal Coating, Type UR, from the nozzle, press the F1 button to send the nozzle back to its home position. Wipe off the tip of the nozzle.



## AV1200-1A Rev B



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 34 OF 71

#### 6.2.4 Verifying Proper Spray Thickness

- Refer to the drawing to confirm the type and target thickness of the Conformal Coating. Write the Conformal Coating type and lot code on the Conformal Coating Lot Log Sheet in Appendix A. Randomly choose one of the 10 aluminum coupons for a Thickness Test. In Figure 6-1 below, Coupon #10 has been chosen. Write the coupon number in the blank next to Coupon Number on the Conformal Coating Lot Log Sheet in Appendix A. Make sure that the aluminum coupon is completely clean of Conformal Coating; clean it with Thinner or Stripper if it is not.

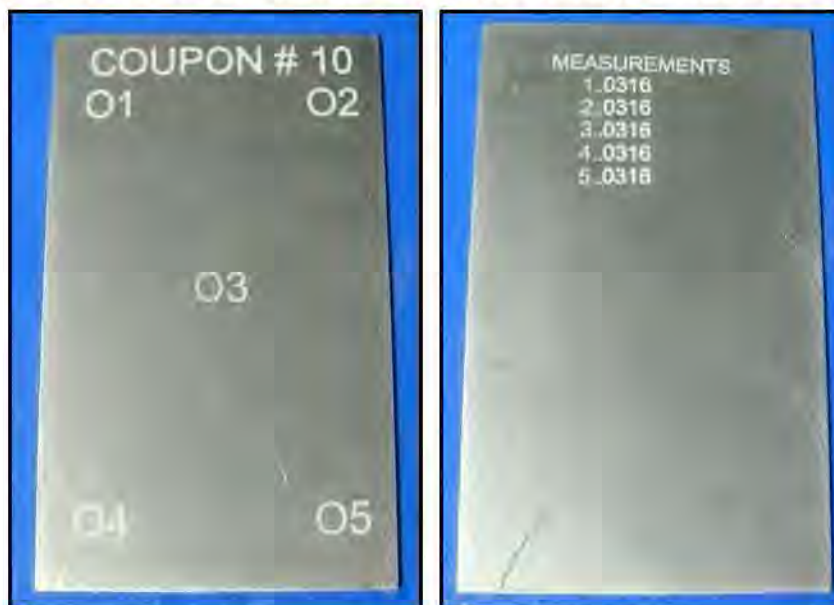


Figure 6-1 Aluminum Coupon #10

- Measure the thickness of the coupon inside each of the five circles (shaped like a 0) to four decimal places (example – 0.0001) with a calibrated micrometer, to verify the thicknesses engraved on the back of the coupon. Write the thickness of each numbered circle (shaped like an O) in the cells in Row B (Bare Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See Section 10 Appendix B for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- Initialize and stabilize the spray from the nozzle on the machine by spraying a piece of dummy cardboard before spraying the aluminum coupon.
- Put the aluminum coupon into the Conformal Coating machine and adjust the brackets to hold it in place. See Figure 6-2 below.



## AV1200-1A Rev B



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 35 OF 71



**Figure 6-2 Adjusting the Brackets in the Machine to Hold the Coupon In Place**

- Program the machine per operating instructions in the PVA Manual. Spray the aluminum coupon completely with the target thickness of Conformal Coating, Type UR, per drawing.
- Let the Conformal Coating on the aluminum coupon cure at ambient room temperature and humidity for 30 minutes, then oven cure it for one hour at 60°C / 140°F. Allow the aluminum coupon to cool in the oven for 30 minutes, with the temperature ramping down to ambient. *Do not record the cure start and end times and cure temperature on the Conformal Coating Lot Log Sheet in Appendix A; you will later record the cure information for the boards themselves there.*
- Measure the thickness of the aluminum coupon inside each of the five numbered circles with the micrometer, to four decimal places (example – 0.0001). Write these measurements in the cells in Row A (CC'd Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See 10 for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- For each of the five numbered circles, subtract the measurement in Row B (Bare Coupon) from the measurement in Row A (CC'd Coupon). Write the result in the cells in Row C (CC Thickness) for each numbered circle.
- Add up the five results in Row C (CC Thickness) and divide by five. You now have the Final Averaged Conformal Coating Thickness; write it in the blank next to Final Averaged CC Thickness.
- Compare the Final Averaged Conformal Coating Thickness with the target thickness specified by the drawing:
  - If the Final Averaged Conformal Coating Thickness is within the specified range, continue to next Step to prepare for board masking.
  - Otherwise, repeat all of the Steps in this section using a new coupon, until the Final Averaged Conformal Coating Thickness is within the range specified by the drawing.



# AV1200-1A Rev B



## AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 36 OF 71

### 6.2.5 Board Preparation

- Write the board Part Number and Serial Numbers on the Conformal Coating Lot Log Sheet in Appendix A. There is room for 90 serial numbers. If you have more than 90 boards in your lot, attach another page to the back of the Conformal Coating Lot Log Sheet with the rest of the Serial Numbers.
- Use Kapton tape, Kapton dots, keep out fixtures, or flex mask to mask the areas of the board where the drawing specifies that they must not have conformal coating on them. All other areas shall be coated with conformal coat. See Figure 6-3 below for masking instructions and Notes on a drawing. See Figure 6-4 below for the masking process in action.

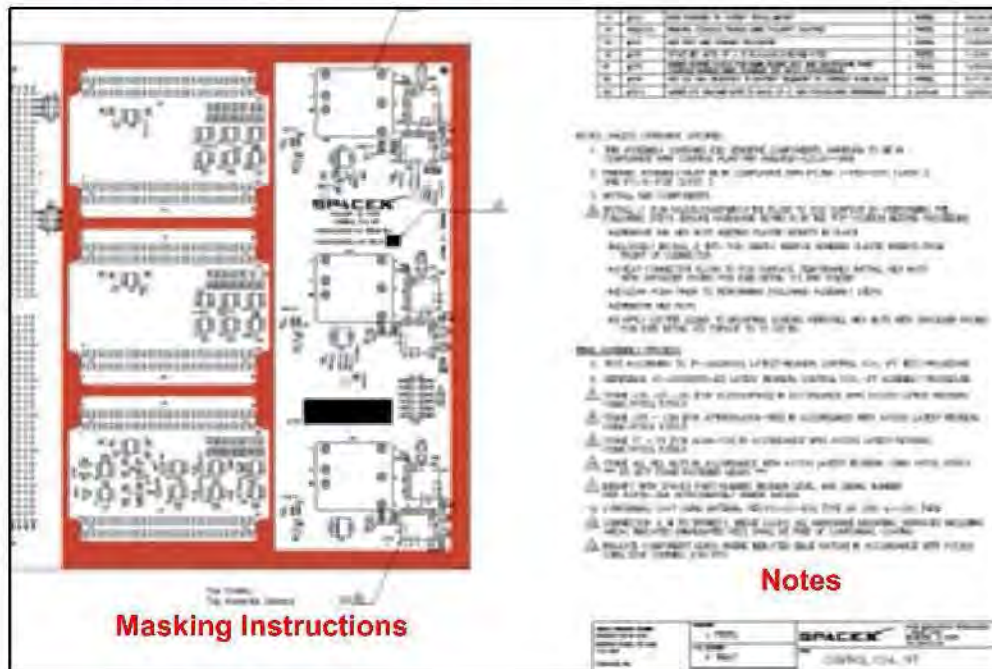


Figure 6-3 Masking Instructions and Notes on a Drawing



Figure 6-4 Peeling and Placing Kapton Dots



## AV1200-1A Rev B



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 37 OF 71

## 6.3 Application

### 6.3.1 Manual Application

- When applying Conformal Coating by hand, it should be applied under the UV (ultraviolet) light, so that the operator can clearly see the areas covered by conformal coating.
- For brush application, the size and type of brush will depend upon the area being coated. A small brush will be necessary for boards with numerous connectors (as connectors shall not be coated with Conformal Coating). For larger areas of Conformal Coating, larger brushes may be used.

### 6.3.2 PVA Machine Application

- Program the machine to spray the correct areas, using the operating instructions in the PVA Manual.
- Adjust the brackets in the machine to hold the board or boards in place during spraying.
- Spray the board or boards with the Conformal Coating, Type UR, using the machine operating instructions in the PVA Manual, at exactly the same thickness that you sprayed the aluminum coupon.

### 6.3.3 Conformal Coating Cure

#### 6.3.3.1 Ambient Cure

- Cure Conformal Coating for 24 hours.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.

#### 6.3.3.2 Oven Cure

- First, cure Conformal Coating at ambient room temperature and humidity for 30 minutes.
- Next, oven cure Conformal Coating for one hour at 65°C / 149°F. Allow the boards to cool down to ambient temperature.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.

## AV1200-1A Rev B



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 38 OF 71

#### 6.3.4 Conformal Coating Lot Log Sheet

- Each lot of boards is to be inspected, the results of the Touch Test (below-Inspection) recorded, dated and stamped off in the Coating Lot Log Sheet (Appendix A) by the Technician and Inspection. Scanned Log Sheet will be attached to Work Order in Warp Drive.

##### Inspection

Conformal coated boards are visually inspected by QA under UV (ultraviolet) light. Any rework of conformal coating shall meet the original configuration.

After 24 hours, perform a Touch Test on one of the five coated areas on the sample coupon. If touching the Conformal Coating leaves a fingerprint, the sample fails. Record the results of the Touch Test on the Conformal Coating Lot Log Sheet in Appendix A.



# EXHIBIT 77

COLOR



SPACE EXPLORATION TECHNOLOGIES

# AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

Procedure:	Rev:	Rev. Date:	Release Trac #
<b>AV1200-1A</b>	<b>C</b>	<b>2013-05-17</b>	<b>6367</b>
In Relation To:		Target Audience:	
<b>NASA STD 8739.1A / IPC J-STD-001</b>		<b>AVIONICS</b>	



Revision	Description	Date
<b>A</b>	AV1200-1A Per Release Trac Ticket #1575	2012/06/08
<b>B</b>	Per Release Trac Ticket #5401	2012/08/17
<b>C</b>	Per Release Trac Ticket #6367	2013/05/17

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## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 6 OF 74

## 4 GENERAL GUIDELINES

### 4.1 PRECAUTIONS

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use a respirator, safety glasses, gloves, or other Personal Protective Equipment (PPE) as needed for fumes and to protect the boards from contamination by skin contact. The MSDSs for the Conformal Coating products say to use them in a well-ventilated area.



## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 32 OF 74

## 6 CONFORMAL COATING

When a conformal coating is specified to be applied to a PCBA follow the steps below.

### 6.1 PRECAUTIONS

Please follow these handling guidelines for your safety and preservation of flight hardware:

- Clear the work space of all unnecessary metal objects and conductors. Remove sharp objects from the bench area.
- Observe ESD precautions when handling boards per SpaceX Document SPX-0000099.
- Observe all FOD precautions when handling boards per SpaceX Document SPX-00001365
- Use gloves, eye protection and facemask, in a well-ventilated areas per the MSDS.

#### 6.1.1 Approved Conformal Coating Products Used by the Avionics Clean Room

Table 6-1 Approved Conformal Coating Products

Approved Component	Part Number	Vendor	Application
Conformal Coating	1A33	HumiSeal	Spray + Brush
Thinner	521	HumiSeal	Spray + Brush
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#### 6.1.2 Products Being Phased Out

TechSpray Fine-L-Kote Conformal Coating, Type UR, PN 2104-12S, is being phased out and will be used to touch up boards that have already been coated with TechSpray. IPA is used to clean boards coated with TechSpray.

## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 33 OF 74

## 6.2 PREPARATION

### 6.2.1 Cleaning Coated Boards

- Prior to these Conformal Coating procedures, the boards must have been cleaned per AV2012 Avionics Assembly / Part Cleaning Standard.

### 6.2.2 Conformal Coating Mix and Viscosity Check

- In the machine Conformal Coating tank, mix the Conformal Coating, Type UR, with Thinner. 3 parts Conformal Coating to 1 part Thinner.
- After mixing the Conformal Coating, check its viscosity using a Zahn Size 2 Viscosity Cup and a calibrated stopwatch.
- Dip the Viscosity Cup into the Conformal Coating tank and start the stopwatch exactly when you lift it up out of the Conformal Coating. Stop the stopwatch exactly when the Viscosity Cup is empty of Conformal Coating.
- The time it takes for the Conformal Coating to completely drain out of the Viscosity Cup should be between 20 and 21 seconds. If the viscosity is not within this range, mix in some more Thinner, for decreasing viscosity, or some more Conformal Coating, for increasing viscosity, as applicable, and measure the viscosity again until it is within the range.
- Record the viscosity on the Conformal Coating Lot Log Sheet in Appendix A. This includes recording viscosity on the Conformal Coating Lot Log Sheet for manual application and touchup of batches of 5 boards or more

### 6.2.3 Dispensing Conformal Coating for Application and Touch-up

- Dispense the Conformal Coating, Type UR, from the PVA machine by pressing the F4 button, holding a container under the nozzle, and then pressing and holding the Purge button. To stop dispensing, let go of the Purge button.
- After dispensing the Conformal Coating, Type UR, from the nozzle, press the F1 button to send the nozzle back to its home position. Wipe off the tip of the nozzle.



## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 34 OF 74

#### 6.2.4 Verifying Proper Spray Thickness

- Refer to the drawing to confirm the type and target thickness of the Conformal Coating. Write the Conformal Coating type and lot code on the Conformal Coating Lot Log Sheet in Appendix A. Randomly choose one of the 10 aluminum coupons for a Thickness Test. In Figure 6-1 below, Coupon #10 has been chosen. Write the coupon number in the blank next to Coupon Number on the Conformal Coating Lot Log Sheet in Appendix A. Make sure that the aluminum coupon is completely clean of Conformal Coating; clean it with Thinner or Stripper if it is not.

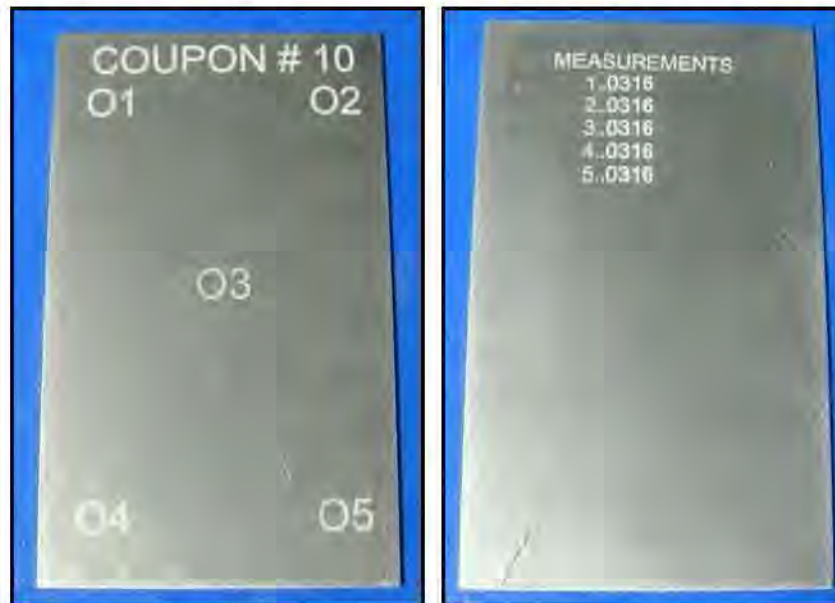


Figure 6-1 Aluminum Coupon #10

- Measure the thickness of the coupon inside each of the five circles (shaped like a 0) to four decimal places (example – 0.0001) with a calibrated micrometer, to verify the thicknesses engraved on the back of the coupon. Write the thickness of each numbered circle (shaped like an O) in the cells in Row B (Bare Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See Section 10 Appendix B for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- Initialize and stabilize the spray from the nozzle on the machine by spraying a piece of dummy cardboard before spraying the aluminum coupon.
- Put the aluminum coupon into the Conformal Coating machine and adjust the brackets to hold it in place. See Figure 6-2 below.



## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 35 OF 74



**Figure 6-2 Adjusting the Brackets in the Machine to Hold the Coupon In Place**

- Program the machine per operating instructions in the PVA Manual. Spray the aluminum coupon completely with the target thickness of Conformal Coating, Type UR, per drawing.
- Let the Conformal Coating on the aluminum coupon cure at ambient room temperature and humidity for 30 minutes, then oven cure it for one hour at 60°C / 140°F. Allow the aluminum coupon to cool in the oven for 30 minutes, with the temperature ramping down to ambient. Do not record the cure start and end times and cure temperature on the Conformal Coating Lot Log Sheet in Appendix A; you will later record the cure information for the boards themselves there.
- Measure the thickness of the aluminum coupon inside each of the five numbered circles with the micrometer, to four decimal places (example – 0.0001). Write these measurements in the cells in Row A (CC'd Coupon) on the Conformal Coating Lot Log Sheet in Appendix A. (See 10 for Non-Digital Micrometer Use Instructions, if your micrometer is not digital.)
- For each of the five numbered circles, subtract the measurement in Row B (Bare Coupon) from the measurement in Row A (CC'd Coupon). Write the result in the cells in Row C (CC Thickness) for each numbered circle.
- Add up the five results in Row C (CC Thickness) and divide by five. You now have the Final Averaged Conformal Coating Thickness; write it in the blank next to Final Averaged CC Thickness.
- Compare the Final Averaged Conformal Coating Thickness with the target thickness specified by the drawing:
  - If the Final Averaged Conformal Coating Thickness is within the specified range, continue to next Step to prepare for board masking.
  - Otherwise, repeat all of the Steps in this section using a new coupon, until the Final Averaged Conformal Coating Thickness is within the range specified by the drawing.



## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 36 OF 74

## 6.3 THICKNESS REQUIREMENT

- IPC-CC-830 Type UR (Urethane based material) shall be applied to meet the following thickness:

Material	Thickness (Inch)
Humiseal 1A33	0.002 ± 0.001

## 6.4 BOARD PREPARATION

- Write the board Part Number and Serial Numbers on the Conformal Coating Lot Log Sheet in Appendix A. There is room for 90 serial numbers. If you have more than 90 boards in your lot, attach another page to the back of the Conformal Coating Lot Log Sheet with the rest of the Serial Numbers.
- Masking Areas:** Masking area instructions are designated by keep out areas on the engineering drawing. See Figure 6-3 below for masking instructions and Notes on a drawing. Use Kapton tape, Kapton dots, keep out fixtures, or flex mask to mask the areas of the board where the drawing specifies that they must not have conformal coating on them. All other areas shall be coated with conformal coat.
- Masking Fasteners:** Masking fasteners instructions are designated by either a Note on the drawing to mask the drive feature of the fastener or being encompassed by the Masking Area instructions. At the minimum the drive feature of the fastener must remain free of conformal coating using Kapton tape, Kapton dots, keep out fixtures, or flex mask.
- See Figure 6-4 below for the masking process in action.



# AV1200-1A Rev C



## AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 37 OF 74

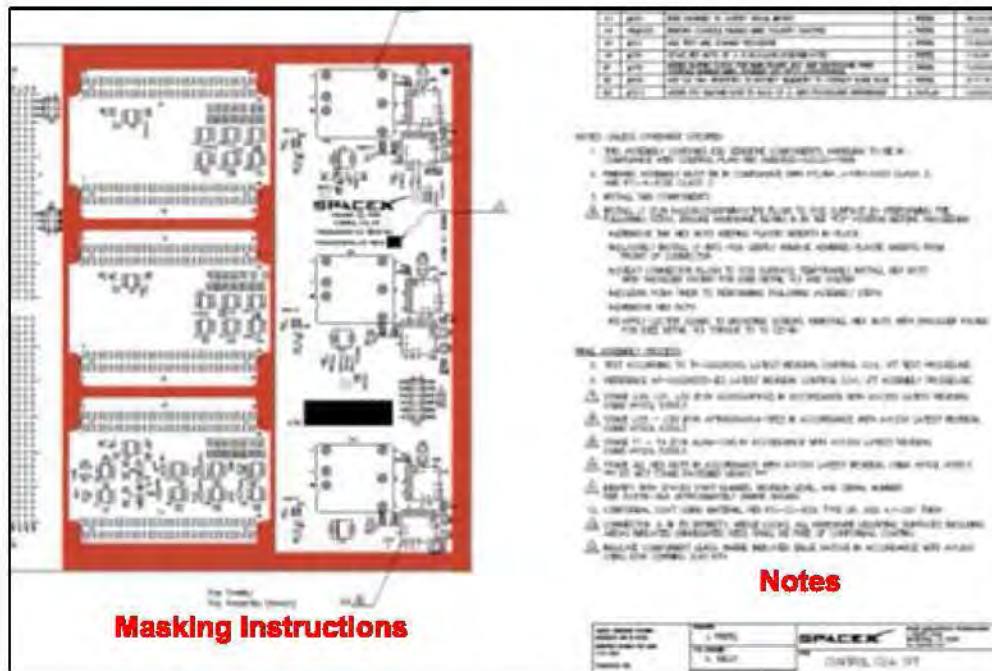


Figure 6-3 Masking Instructions and Notes on a Drawing



Figure 6-4 Peeling and Placing Kapton Dots

## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 38 OF 74

## 6.5 APPLICATION

### 6.5.1 Manual Application

- When applying Conformal Coating by hand, it should be applied under the UV (ultraviolet) light, so that the operator can clearly see the areas covered by conformal coating.
- For brush application, the size and type of brush will depend upon the area being coated. A small brush will be necessary for boards with numerous connectors (as connectors shall not be coated with Conformal Coating). For larger areas of Conformal Coating, larger brushes may be used.

### 6.5.2 PVA Machine Application

- Program the machine to spray the correct areas, using the operating instructions in the PVA Manual.
- Adjust the brackets in the machine to hold the board or boards in place during spraying.
- Spray the board or boards with the Conformal Coating, Type UR, using the machine operating instructions in the PVA Manual, at exactly the same thickness that you sprayed the aluminum coupon.

### 6.5.3 Conformal Coating Cure

#### 6.5.3.1 Ambient Cure

- Cure Conformal Coating for 24 hours.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.

#### 6.5.3.2 Oven Cure

- First, cure Conformal Coating at ambient room temperature and humidity for 30 minutes.
- Next, oven cure Conformal Coating for one hour at 65°C / 149°F. Allow the boards to cool down to ambient temperature.
- Record the cure start and end times and the cure temperature on the Conformal Coating Lot Log Sheet in Appendix A.



## AV1200-1A Rev C



### AVIONICS STANDARD OPERATING PROCEDURE: POLYMERIC APPLICATION ON ELECTRONIC ASSEMBLIES

RELATED TO: NASA STD 8739.1A / IPC J-STD-001 | TARGET: Avionics

PAGE 39 OF 74

#### 6.5.4 Conformal Coating Lot Log Sheet

- Each lot of boards is to be inspected, the results of the Touch Test (below-Inspection) recorded, dated and stamped off in the Coating Lot Log Sheet (Appendix A) by the Technician and Inspection. Scanned Log Sheet will be attached to Work Order in Warp Drive.

##### 6.5.4.1 Inspection

Conformal coated boards are visually inspected by QA under UV (ultraviolet) light. Any rework of conformal coating shall meet the original configuration.

After 24 hours, perform a Touch Test on one of the five coated areas on the sample coupon. If touching the Conformal Coating leaves a fingerprint, the sample fails. Record the results of the Touch Test on the Conformal Coating Lot Log Sheet in Appendix A.

# EXHIBIT 78

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Revolutionizing Access to Space

**SPACEX**

Space Exploration Technologies

# Hazard Communication

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JUAREZ V PVA SPX002044

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# Introduction

SPACEX

- About 32 million workers are potentially exposed to one or more chemical hazards
- There are approximately 650,000 existing chemical products, and hundreds of new ones being introduced annually
- Chemical exposure may cause or contribute to many serious health effects

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# Why do you need to know this information?

The SpaceX logo, featuring the word "SPACEX" in a blue, sans-serif font, with a stylized white and blue "X" to the right.

- Everyone working with/around Hazardous Materials has the **Right** and the **Responsibility** to be aware of the hazards and proper safe work procedures for hazardous materials used or produced in their work area.
- The primary objective is for you to know how and where to find specific hazard information.





# Why do you need to know this

SPACEX

## Presenter

Knowledge is power. The knowledge of chemical hazards, and the proper application of that knowledge, will keep you and your fellow employees safe.

- Everyone working with/around Hazardous Materials has the **Right** and the **Responsibility** to be aware of the hazards and proper safe work procedures for hazardous materials used or produced in their work area.
- The primary objective is for you to know how and where to find specific hazard information.

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# Who is covered?

SPACEX

Cal/OSHA's Hazard Communication (HazCom) standard applies to general industry, shipyard, marine terminals, long shoring, and construction employment and covers chemical manufacturers, importers, employers, and employees exposed to chemical hazards.

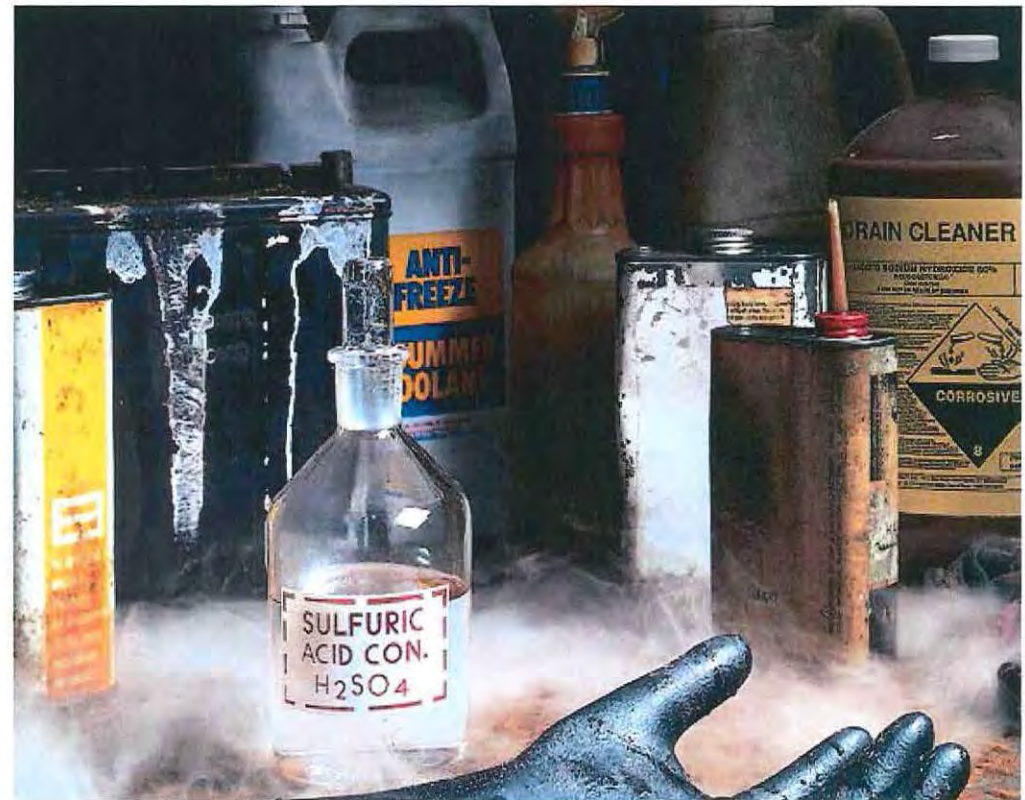
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# Hazard Communication

SPACEX

- Material Safety Data Sheets
- Labeling
- Training
- Written Program



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These are the four main components of our Hazard Communication Program.

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SPACEX

- Material Safety Data Sheets
- Labeling
- Training
- Written Program



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# Purpose of OSHA's Hazard Communication Standard

**SPACEX**

To ensure that employers and employees know about work hazards and how to protect themselves so that the incidence of illnesses and injuries due to hazardous chemicals is reduced.

## Hazard Communication Program

<b>Program</b>
_____
_____
_____
_____

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## Container Labeling



## Material Safety Data Sheet

<b>MSDS</b>
_____
_____
_____
_____

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# Employer Responsibilities



- Identify and list hazardous chemicals in their workplaces
- Obtain Material Safety Data Sheets (MSDSs)
- Implement a written HazCom program
- Communicate hazard information to employees through labels, MSDSs, and formal training programs



#### Presenter

The list of hazardous chemicals here can be found in the Table of Contents in our big blue MSDS books as well as in our online archive. All products that arrive at our facility should have the MSDS with it. If it does not, please contact the EHS Department. It is also vital that for those of you that can, and do, order chemicals, is to ensure that the included MSDS is promptly passed on to the EHS Department for entry into our MSDS archives. This is key to staying safe and in compliance.

SPACEX

hazardous chemicals in their

- Obtain Material Safety Data Sheets (MSDSs)
- Implement a written HazCom program
- Communicate hazard information to employees through labels, MSDSs, and formal training programs

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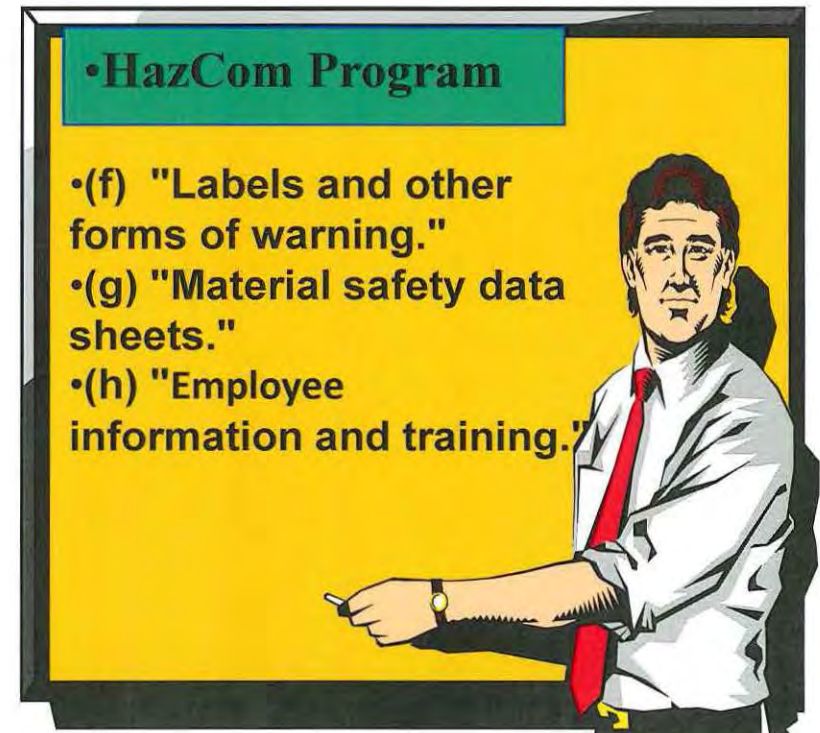


# Why is a written program required?

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- Ensures that all employers receive the information they need to inform and train their employees
- Provides necessary hazard information to employees



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## Why is a written program required?

### Presenter

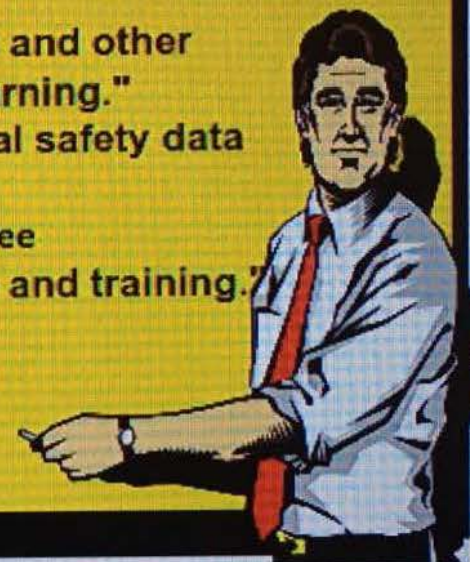
The written program provides the foundation for our Hazard Communication Program.

SPACEX

- Ensures that all employers receive the information they need to inform and train their employees
- Provides necessary hazard information to employees

### •HazCom Program

- (f) "Labels and other forms of warning."
- (g) "Material safety data sheets."
- (h) "Employee information and training."



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# Written HazCom Program Requirements

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- Describes container labeling, MSDSs, and employee training for each workplace
- List of the hazardous chemicals
- Make available information regarding hazards and protective measures to other employers onsite

# How can workplace hazards be minimized?

SPACEX

- The first step in minimizing workplace hazards is to perform a thorough hazard assessment
- Employers can rely on the evaluations performed by the manufacturers or importers to establish the hazards of the chemicals they use
  - This information is obtained from MSDSs and labels

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# How can workplace hazards



## Presenter

Chemical manufacturers and importers must review scientific evidence on the hazards of chemicals they produce or import and report findings to their employees and to employers who distribute or use their products.

- The first step in minimizing workplace hazards is to perform a thorough hazard assessment
- Employers can rely on the evaluations performed by the manufacturers or importers to establish the hazards of the chemicals they use
  - This information is obtained from MSDSs and labels

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# How Must Chemicals be Labeled?

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Each container of hazardous chemicals entering the workplace must be labeled or marked with:

- **Identity** of the chemical\*
- Appropriate **hazard warnings**\*
- **Name and address** of the responsible party (manufacturer or distributor)

\*Required on secondary container label



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# How Must Chemicals be Labeled?

SPACEX

## Presenter

Chemical manufacturers and importers must convey the hazard information to downstream employers by means of labels on containers and Material Safety Data Sheets (MSDSs). Language used on the warning label does not have to be identical to that on the MSDS.

A secondary container is a container that is filled from a larger, primary container such as a 55 gallon Acetone drum for example. The secondary container label does not need the name and address of the manufacturer or distributor, just the name of the chemical and its primary hazard.

Consumer products having labels meeting requirements of the Consumer Product Safety Act do not have to have additional labeling under the HazCom Standard.

Hazardous chemicals  
must be

h:

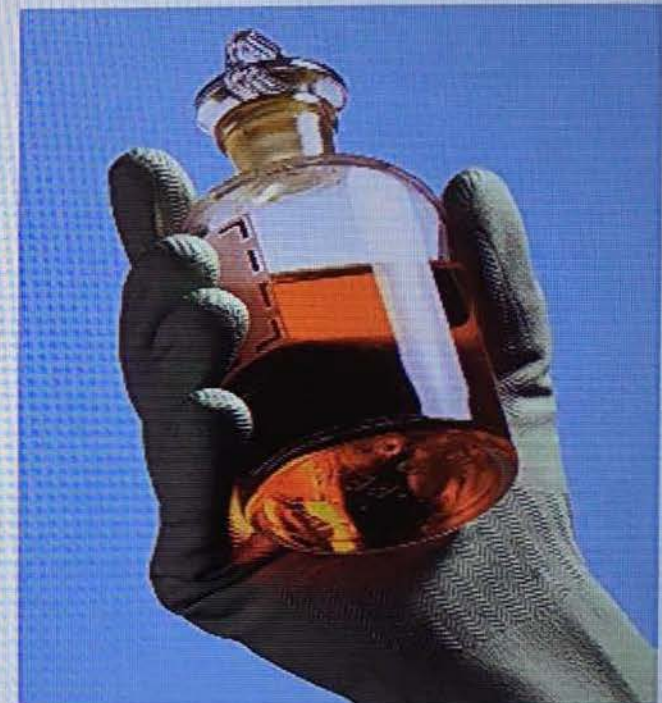
chemical\*

hazard warnings\*

ess of the

y (manufacturer

ndary container



label

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# Container Labeling in the Workplace

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- The hazard warning can be any type of message, picture, or symbol that provides information on the hazards of the chemical(s)
- Labels must be legible, in English (plus other languages, if desired), and prominently displayed



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# Material Safety Data Sheet

SPACEX



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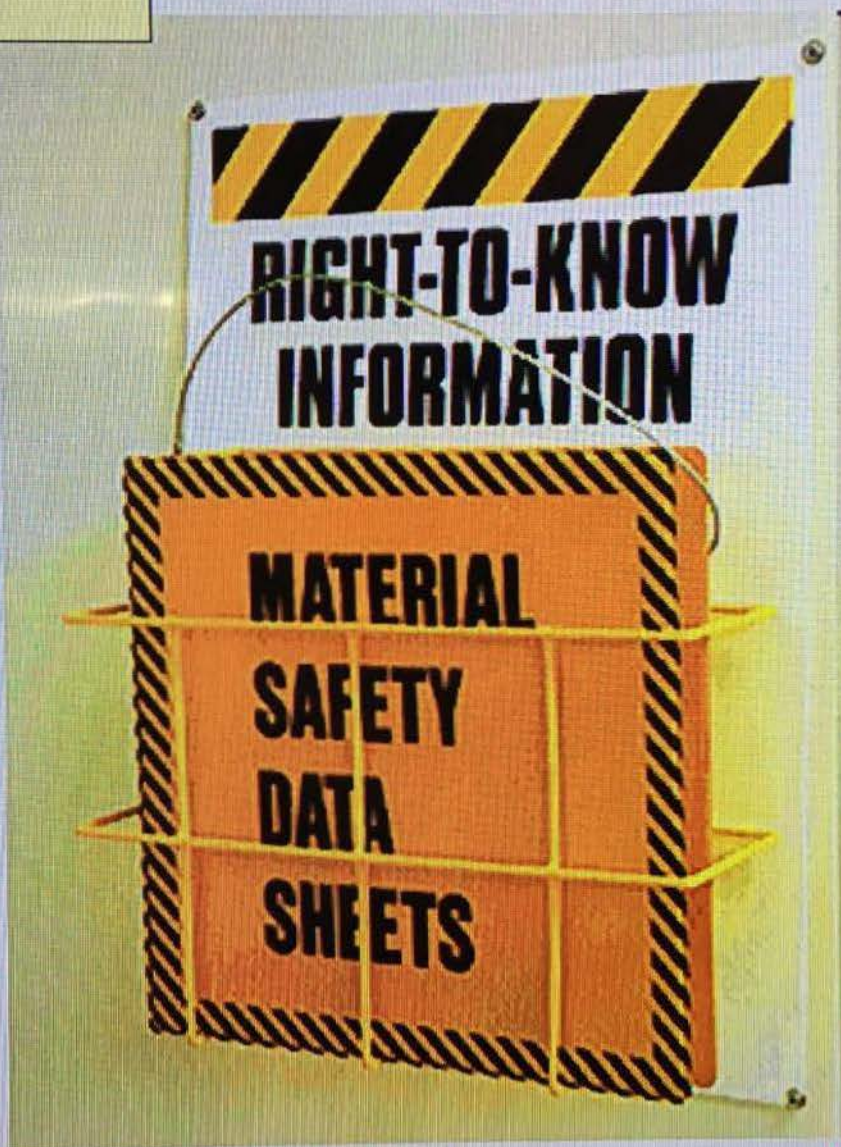


## Presenter

A Material Safety Data Sheet (MSDS) is one of the most critical components of our Hazard Communication program.

## Sheet

SPACEX



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# Material Safety Data Sheets



Prepared by the chemical manufacturer, distributor, or importer and describe:

- Identity of hazardous chemicals
- Physical hazards, such as fire and explosion
- Health hazards, such as signs of exposure
- Routes of exposure
- Precautions for safe handling and use
- Emergency and first-aid procedures
- Control measures



# Material Safety Data Sheets



## Presenter

Chemical manufacturers and importers must develop an MSDS for each hazardous chemical they produce or import, and must provide the MSDS at the time of the initial shipment to a downstream distributor or user. Distributors also must ensure that downstream employers are similarly provided an MSDS.

The MSDSs must be updated by the chemical manufacturer or importer within three months of learning of "new or significant information" regarding the chemical's hazard potential.

OSHA does not require that MSDSs be provided to purchasers of household consumer products (such as "windex" and "white-out") when the products are used in the workplace in the same manner that a consumer would use them, i.e.; where the duration and frequency of use (and therefore exposure) is not greater than what the typical consumer would experience. Employees who are required to work with hazardous chemicals in a greater duration and frequency of exposure than a normal consumer have a right to know about the properties of those hazardous chemicals.

Chemical manufacturer,  
importer and describe:

hazardous chemicals

, such as fire and explosion

such as signs of exposure

are

safe handling and use

first-aid procedures

s

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# Material Safety Data Sheets



- Must be in English and include information regarding the specific chemical identity and common names
- Must provide information about the:
  - Physical and chemical characteristics
  - Health effects
  - Exposure limits
  - Carcinogenicity (cancer-causing)
  - Identification (name, address, and telephone number) of the organization responsible for preparing the sheet
- Must be readily accessible to employees in their work area during all work shifts



#### Presenter

Our MSDS's are always available in our online archive as well as in the big blue MSDS books in the kitchen area.

## MSDS Data Sheets

SPACEX

- Must be in English and include information regarding the specific chemical identity and common names
- Must provide information about the:
  - Physical and chemical characteristics
  - Health effects
  - Exposure limits
  - Carcinogenicity (cancer-causing)
  - Identification (name, address, and telephone number) of the organization responsible for preparing the sheet
- Must be readily accessible to employees in their work area during all work shifts

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- [illegible]

49

# MSDS - Trade Secrets

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- A "trade secret" is something that gives an employer an opportunity to obtain an advantage over competitors who do not know about the trade secret or who do not use it
- Includes the chemical name, the Chemical Abstracts Services (CAS) Registry Number, or any other specific information that reveals the precise designation



# MSDS - Trade Secrets



- It does not extend to PELs or TLVs
  - If the hazardous chemical or a component thereof has a PEL or TLV, this must be reflected on the MSDS
- Limited disclosure of trade secrets to health professionals who are furnishing medical or other occupational health services to exposed employees, employees and their designated representatives, under specified conditions of need and confidentiality

# MSDS - Trade Secrets

SPACEX

## Disclosure in a Medical Emergency

- The chemical manufacturer, importer, or employer must immediately disclose the specific chemical identity of a hazardous chemical to a treating physician or nurse when the information is needed for proper emergency or first-aid treatment
- As soon as circumstances permit, the chemical manufacturer, importer, or employer may obtain a written statement of need and a confidentiality agreement



# Confidential Training

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Training is required for employees who are exposed to hazardous chemicals in their work area:

- At the time of initial assignment
- Whenever a new hazard is introduced into their work area



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Managers, in conjunction with the EHS Department, will ensure that all of their employees are trained in the safe use of all hazardous substances introduced into their workplace.

Training is required for employees who are exposed to hazardous chemicals in their work area:

- At the time of initial assignment
- Whenever a new hazard is introduced into their work area



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# What training is needed to protect workers?

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- Explanation of the HazCom program, including information on labels, MSDSs, and how to obtain and use available hazard information
- Hazards of chemicals
- Protective measures such as engineering controls, work practices, and the use of PPE
- How to detect the presence or release of a hazardous chemical (using monitoring devices, observation, or smell)



# What training is needed to

## Presenter

The MSDS is the primary source for hazard communication training. In it you will find information on the hazards of chemicals, what Personal Protective Equipment (PPE) is required to keep you safe, what sort of work practices should be used, how to detect the presence of the chemical and what to do in the event of a leak or spill.

SPACEX

the HazCom program, including  
labels, MSDSs, and how to obtain and  
use available hazard information

- Hazards of chemicals
- Protective measures such as engineering controls, work practices, and the use of PPE
- How to detect the presence or release of a hazardous chemical (using monitoring devices, observation, or smell)

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# Confidential Proposition 65

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- Safe Drinking Water and Toxic Enforcement Act added to Hazard Communication in 1991
- Requires the governor to publish a list of chemicals known to the State of California to cause cancer, birth defects, or reproductive harm

# Confidential Proposition 65

SPACEX

- List of chemicals may be found at the California Office of Environmental Health Hazard Assessment's website:

[www.oehha.ca.gov](http://www.oehha.ca.gov)

- Full text of Prop 65 is in T22CCR, Section 12000 et seq.



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**Proposition 65**

**SPACEX**

# **WARNING**

**THIS AREA CONTAINS CHEMICALS KNOWN TO  
THE STATE OF CALIFORNIA TO CAUSE CANCER  
AND BIRTH DEFECTS OR OTHER REPRODUCTIVE  
HARM.**

# NFPA 704 Rating System

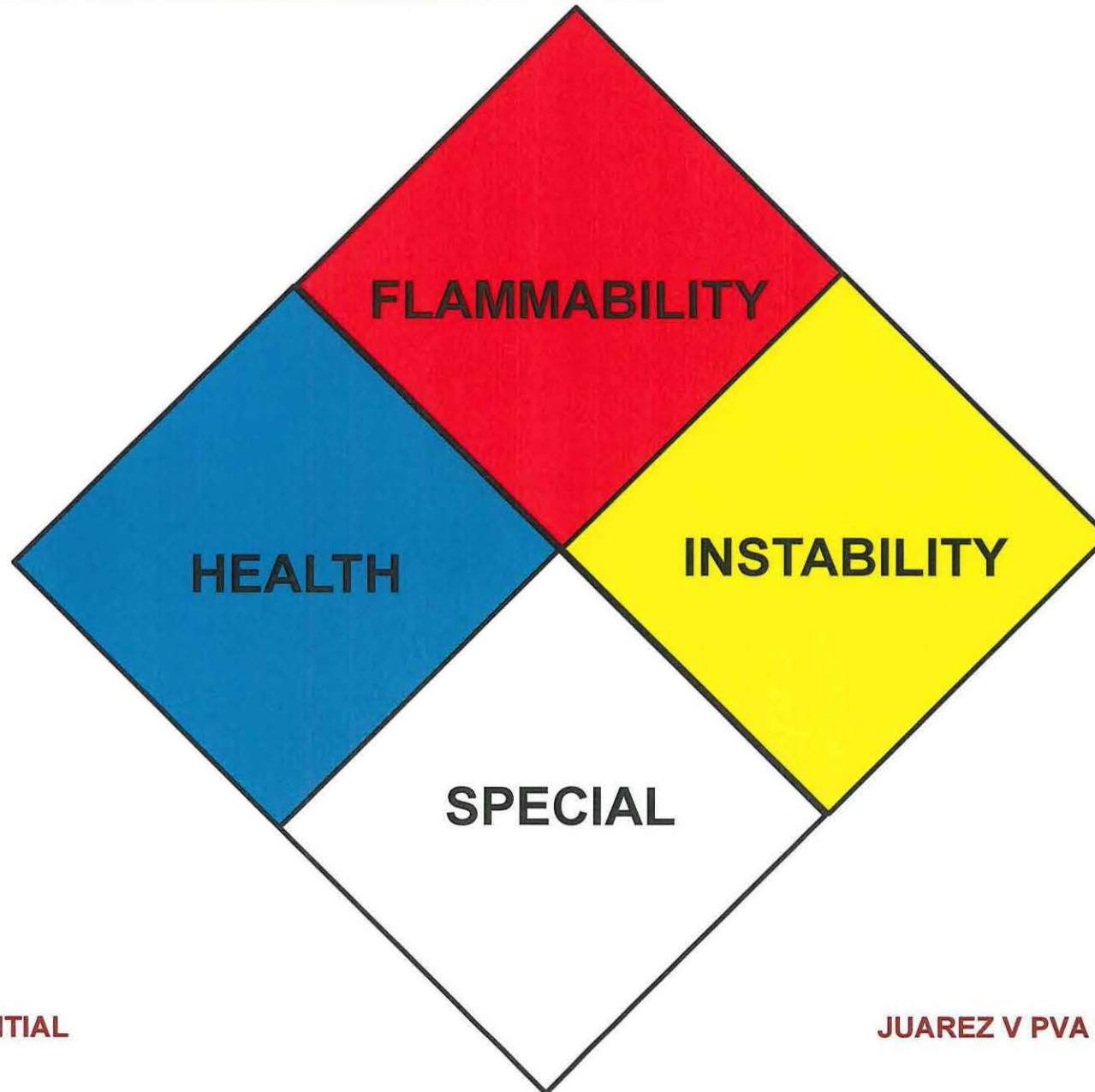


- NFPA - National Fire Protection Agency
  - Writes many standards incorporated by OSHA
- Applicable to us here at SpaceX since we use and store hazardous materials
- Different from Department of Transportation designations



# The NFPA Diamond

SPACEX



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# Where Are They Here?

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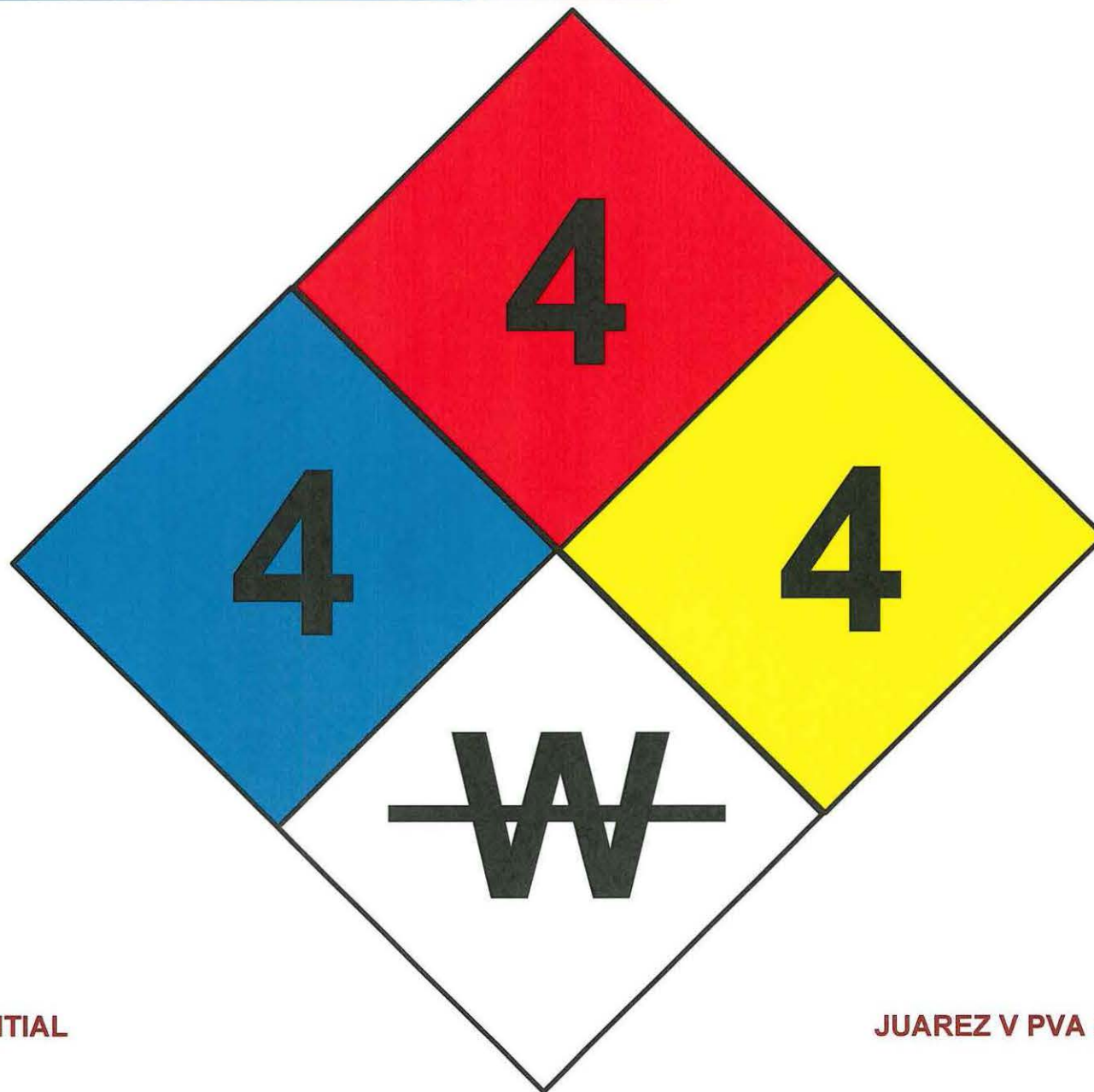


- On the corners of the main building where the driveways enter the complex.
- On the outside of the various enclosed work areas inside the building.
- On some chemical labels where the diamond does represent the chemical hazards inside.



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An Example

SPACEX



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# Other Important Labels

SPACEX

- Department of Transportation (DOT)
  - 9 hazard classes
  - Specific colors and designs
  - You see them around here



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Summary










The SpaceX logo, featuring the word "SPACEX" in a blue, sans-serif font, with a stylized white and blue swoosh trailing off to the right.

- OSHA's Hazard Communication Standard is based on a simple concept - that employees have both a need and a right to know the hazards and identities of the chemicals they are exposed to when working
- Employees also need to know what protective measures are available to prevent adverse effects from occurring

# The Future . . .



GHS Pictograms and Hazard Classes

		
<ul style="list-style-type: none"> <li>▪ Oxidizers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Flammables</li> <li>▪ Self Reactives</li> <li>▪ Pyrophorics</li> <li>▪ Self-Heating</li> <li>▪ Emits Flammable Gas</li> <li>▪ Organic Peroxides</li> </ul>	<ul style="list-style-type: none"> <li>▪ Explosives</li> <li>▪ Self Reactives</li> <li>▪ Organic Peroxides</li> </ul>
		
<ul style="list-style-type: none"> <li>▪ Acute toxicity (severe)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Corrosives</li> </ul>	<ul style="list-style-type: none"> <li>▪ Gases Under Pressure</li> </ul>
		
<ul style="list-style-type: none"> <li>▪ Carcinogen</li> <li>▪ Respiratory Sensitizer</li> <li>▪ Reproductive Toxicity</li> <li>▪ Target Organ Toxicity</li> <li>▪ Mutagenicity</li> <li>▪ Aspiration Toxicity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environmental Toxicity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Irritant</li> <li>▪ Dermal Sensitizer</li> <li>▪ Acute toxicity (harmful)</li> <li>▪ Narcotic Effects</li> <li>▪ Respiratory Tract Irritation</li> </ul>

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**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that on August 27, 2018, a true and correct copy of **DECLARATION OF DUC Q. PHAN IN SUPPORT OF DEFENDANT PRECISION VALVE & AUTOMATION, INC.'S MOTION FOR SUMMARY JUDGMENT** has been served via ECF upon all counsel of record in the Court's electronic filing system.

By: /s/ Jerry Dumlao

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Schweitzer

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